Appendix C

Fire Protection / Life Safety Code Analysis

APPENDIX C

FIRE PROTECTION/LIFE SAFETY CODE ANALYSIS
IBC 2003

NOTE TO DESIGNER: This document is a preliminary analysis used for concept development. It does not contain

All requirements and does not relieve the designer of complete code and criteria review, compliance and documentation responsibilities during proposal preparation and final Design development.

Building Description: One story, approximately 76,156SF Elementary School

Occupancy: **Educational** (305)

Assembly areas accessory to Educational not considered a separate occupancy (302.2.1)

Separations: **Incidental Uses** (Table 302.1.1):

Storage (>100 SF):	1 hour
Laundry Rooms (>100 SF):	1 hour
Boiler Rooms:	1 hour or sprinklered

Automatic Sprinkler System: **Fully Sprinkled**: *Note: Includes Day Care if children over 2.5 years old. (305.2)*

Stages and Platforms Storage and Provisions of section 410 shall apply to stages and platforms

Maximum Height: **2 Stories** for Education Occupancies (Table 503);
3 stories if building is sprinkled (504.2)

Maximum Area: Per Table 503:

Education: 14,500

Area Modification: Area limited by Table 503 shall be permitted to be increased due to frontage and automatic sprinkler system (506)

Education Occupancy

Equation 5-1 (maximum allowable assumed):

Aa = At + (At If / 100) + (At Is / 100).
Where:
Aa = Allowable Area per Floor (square feet)
At = Allowable Area per Floor from Table 503 (14,500 s.f.)
If = Area increase due to frontage per Section 506.3 **(75% ASSUMED)**
Is = Area increase due to sprinkler per Section 506.3 (300%)

Solve Equation 5.1
Aa = 14,500s.f. + [(14,500s.f.)(75)/100] + [(14,500s.f.)(300)/100]
Aa = 14,500 s.f. + 10,875 s.f. + 43,500 s.f.
Aa = **68,875 s.f. MAX allowed < 76,156 s.f. actual**

Fire Walls: ***SEPARATION OF BUILDING BY A 3-HOUR FIRE WALL IS REQUIRED BY AREA LIMITS ABOVE. (705; TABLE 705.4) LOCATION TO BE DETERMINED BY DESIGN-BUILD ARCHITECT***

Construction Type: **Type II-B** Table (602.1); Unprotected, non-combustible.

Rated Walls: Exit Stairways: **1 hour** (1005.3.2)
Records Storage: **1 hour** (MIL HDBK 100BC)

Number of Exits: **3** in Gym since Occupant Load exceeds < 1000 (Table 1018.1)
3 in Cafeteria since Occupant Load is <1000
2 in areas of <500
Note: 1 exit access is permitted if Occupant Load is <50 (1018.2.1)

In Assembly areas, a main exit must accommodate 50% of capacity (1024.2)

Occupancy: **Educational** (6.1.3): Classrooms and incidental areas.
Assembly (6.1.2): Multi-Purpose & Gymnasium.
Day Care (6.1.4): Child Care and Nursery area.
Table 7.3.1.2
Mixed Occupancy (6.1.14.2): Most restrictive of the two requirements for means of egress, construction, protection, etc. applies throughout the building.

Note: Educational Occupancy includes Pre-school children, if primarily educational. (14.1.4.2)

Occupant Load: **Occupant Load Calculations** (Table 7.3.1.2)
Assembly; Gymnasium & Cafeteria: 7 SF/person …..1,166 people
Kitchens: 100 SF/person……20 people
Media Center - Stacks: 100 SF/person……...11 people
Media Center: 50 SF/person (net)……..26 people
Stage: 15 SF/person (net)……...59 people
Classrooms: 20 SF/person (net)……1,505 people
Day Care: 35 SF/person (net)…….81 people
Business Use: 100 SF/person…….63 people
Storage: N/A
TOTAL……..2,931people

Construction Type: **Type II (000)** (Table 12.1.6); if **Assembly** area is sprinkled.

Separation: **See IBC Section of Code Analysis for separation requirements.**

Subdivision: School Buildings must be subdivided by 1-hour smoke barriers if the area exceeds 30,000 SF or over 300' long.

Exit Capacity: Exit capacity must be sufficient for simultaneous occupancy unless approved by the appropriate authority. (12.1.2.4)

Assembly areas shall have a main exit capable of accommodating half of the occupants. (12.2.3.3)

Corridor width shall be 6' clear wide (min). (14.2.3.2)

Exit Width: Level Components: 0.2" per person (Table 7.3.3.1)

Exit Width Required:

2,931 people @ 0.2" / person = 614"

Exit Width Provided:

41 leafs @ 34" clear width = 1,394" > 614" required **O.K.**

Exits: Doors must swing in direction of exit if the room's capacity is 50 or more. (7.2.1.4.2)

Means of egress may go through one space IF the building is sprinkled AND the travel distance to the corridor is less than 75 feet. (14.2.5.4)

Travel Distance: **200 feet**, sprinkled (12.2.6 & 14.2.6) (Table A7.6.1)
Dead end corridors = **50'** if sprinkled in Educational (14.2.5.2)
20' in Assembly (Table A7.6.1)

Area of Refuge: One (1) area of refuge (30" x 48" each) for every 200 occupants. (7.2.12.3.1)

Ventilation: A regular stage >1,000 SF shall require emergency ventilation means. (12.4.5.5)

Finishes: Class A or Class B in Assembly (12.3.3.2)
Class A in exits; Class A or B in all other educational spaces (14.3.3.2)

Number of Exits: **2** per floor (14.2.4); **2** per balcony (7.4.1.1); **3** per floor if occupant load is between 500 – 1000. (7.4.1.2 (1))

Portable Fire Extinguishers (NFPA 10) Maximum travel distance to fire extinguisher: 75 feet